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and that the incapacity for plasmolysis is due to a hardening of the protoplasm. The main evidence for the hardening of the protoplasm is the failure of chloroplasts to be displaced by a centrifugal force of about 1000 gravities, which ordinarily displaces them readily. This process of hardening is reversed (physico-chemically and physiologically) by transferring the cells to aluminium-free solutions. The slow rate of reversing leads the author to postulate the tying up of the aluminium in an indiffusible form. It is only in moderate concentrations that aluminium salts produce the effect; in higher concentrations the protoplasm does not harden. Anthocyanin cells cannot be thus hardened, probably due to high sugar content. The author relates this to the fact that non-electrolytes hinder the precipitation of proteins by ions. He also thinks that aluminium salts are specific only in that their low toxicity enables them to bring about such a fundamental physical change in the protoplasm without killing it. While most salts produce such a change, it is not physiologically reversible.—WILLIAM CROCKER.

Individuality of the chromosome.—A four-years' study of the vegetative and reproductive nuclei of *Carex aquatilis* has brought SROUT⁴⁶ to the conclusion that the chromosome is an individual organ, maintaining its identity through successive cell generations. He finds that even in resting nuclei the chromosomes are visible as definite bodies which can be counted, and that these chromosomes can be traced through all the stages of vegetative and reduction divisions, except synapsis. Spiremes are formed in both vegetative and reduction divisions, but even in the spirem the individual chromosomes are distinguishable. In the vegetative spirem there is no evidence of any splitting, the longitudinal splitting of the chromosome appearing only after the chromosomes have become arranged in the nuclear plate. In the metaphase of the heterotypic mitosis the chromosomes form a more or less obvious double spirem. The heterotypic mitosis separates whole chromosomes which have been previously paired. Although the study would have been more satisfactory if the stages in synapsis had been more complete, the results form an important addition to the already strong evidence that the chromosome is an individual organ. *Carex aquatilis*, like *Carex acuta* described by JUEL, forms only one pollen grain from a pollen mother cell, the other three aborting at an early stage.—CHARLES J. CHAMBERLAIN.

Seedling anatomy.—HILL and DEFRAINE⁴⁷ have worked long enough upon seedling anatomy to have come to some very interesting conclusions. Citing numerous facts that have been used in phylogenetic conclusions, they state that they "see no necessity for preserving seedling anatomy from the fate already meted out to other structural features which were at one time considered as

⁴⁶ SROUT, A. B., The individuality of the chromosomes and their serial arrangement in *Carex aquatilis*. Archiv. Zellforschung 9:114-140. pls. 11, 12. 1912.

⁴⁷ HILL, T. G., and DEFRAINE, E., A consideration of the facts relating to the structure of seedlings. Ann. Botany 27:257-272. 1913.